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ABSTRACT

This paper discusses valuing information and its supporting technologies in the global environment. Different value propositions are explored from a financial, social, cultural, political, economic, corporate, and personal values perspective. Various means of measuring the relevancy of these value propositions to the individual, organization or government agency, and society in general are identified. The paper also provides a contextual analysis of the development of information, knowledge, and supporting technologies since the 1970s when computing was mainstreamed into organizations and had its impact on decision-making, workflow, and service delivery. A model of valuing information and intellectual capital on the balance sheet, that is appropriate to the new millennium and the rise of the knowledge organization, is explored, together with an overview of the future state for libraries and information services. (MES)

Value and Performance in the IT Society

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Value and Performance in the IT society

Jo Bryson

Introduction

What compels an individual, library, organisation or government to value and measure the performance of their information, knowledge and supporting technologies? Is it driven by economic necessity, by the maxim that what gets measured gets managed, by curiosity or something else. The answer is all of the above and more. For in the global information environment, it is critical to be able to identify and manage different value propositions from a financial, political, corporate, social, cultural, personal and community values perspective in order to meet diverging and complex needs and to exploit the total worth of the information and knowledge age. A further component in ensuring that information, knowledge and supporting technologies are performing to their greatest potential is the ability to develop relevant and meaningful performance measures.

This paper explores the different value propositions from a financial, political, corporate, social, cultural, personal and community values perspective, and identifies various means of measuring the relevancy of these value propositions to the individual, organisation or government agency, and society in general.

It also provides a contextual analysis of the development of information, knowledge and supporting technologies since the 1970s when computing was mainstreamed into organisations and had its impact on decision-making, workflow and service delivery. A model of valuing information and intellectual capital on the balance sheet, that is appropriate to the new millennium and the rise of the knowledge organisation, is explored; together with an overview of the future state for libraries and information services.

Valuing information and its supporting technologies in the global environment

The global information environment is political, economic, social and cultural. It is both personal and corporate. Nicholas Negroponte talks of a world of bits or electronic impulses rather than tangible or physical reality of the past industrial age. These electronic impulses carry knowledge and information as the new source of wealth, power and self-esteem.

There is an emerged role of information and knowledge in economic and social activities, driven by globalisation, consumerism and technology. All organisations across the service, industrial and government sectors have become more information intensive and the home is being wired to receive multiple information channels to the fridge, television, microwave, mobile phone and car. Wireless Access Protocol (WAP) technologies are delivering information on the move, customised to meet individual needs, anyplace/ anywhere, any time/ 24x7.

Whether it is in a public library or information centre, a commercial entity, a research institution, university or a virtual information source such as a portal or vortal, the ability to measure the value and performance of information and its supporting technologies is critical to being able to substantiate success.

The word 'value' presents opportunities for measuring worth. For example, value can be:

- An estimate or appraisal of being worth a specified sum or amount;
- A standard of valuation in an exchange;
- A measure of worth, importance or usefulness. The relative merit or status according to an estimated desirability or utility of a thing; or

- The quality of a thing, considered in respect of its ability to serve a specified purpose or cause or effect.

Multiple value propositions

There are different value propositions for information and its supporting technologies' products and services in the global information environment. These are financial, social, cultural, political and economic values, contributing either exclusively or with other values to success by individuals, private sector organisations, educational institutions, government agencies, not-for-profit entities and the general community.

Financial value

The financial value of information and its supporting technologies' products and services is centred on estimates or appraisals of their being worth a specified sum or amount. One method of determining a financial value is by measuring the value for money of knowledge and information and its delivery channels to individuals, the organisation or the community. That is, the extent to which the information assisted or made the difference in increasing financial strength. This can be measured by evaluating how the provision of the information assisted in a unique manner with delivering cost savings, managing financial risk, improving profits or creating new valuable assets.

A further mechanism for attributing financial value to individuals, the organisation or the community is to measure the impact of access to accurate, comprehensive, credible and current information on productivity and social cohesion associated with value chains in organisations or the community. The value chain is the chain of activities through which the organisation transforms its input resources such as raw data into products and services that it delivers to its customers. Each of the activities builds upon the value of the previous activities. An important component of quality service is to get the steps in the product or service delivery development process, the value chain, right first time every time. When this occurs, it increases the extent to which services can be improved and customer needs satisfied. This is because service quality costs go down as the organisation does not spend time repeatedly fixing problems or dealing with disgruntled customers. By correcting errors at the beginning of the value chain, the subsequent processes are more robust. In turn the services become more valued, the financial value is higher as costs are reduced, loyalty is greater, and value is added to the political environment as any source of negativity becomes more benign.

The value of information products and services is an important consideration as a standard of valuation in an exchange. In determining whether the potential for exchange exists through exchange systems analysis, two or more parties must possess something of perceived value that can be exchanged. Furthermore, an assessment of the value of the information product or service will be made in order to decide the level or amount of commodity given in exchange. This commodity may be time, another piece of information, money or goodwill.

In financial terms there is a growing discrepancy between the book value and the market value of organisations that is largely attributed to information and intellectual capital. Companies are seeking alternative ways to the traditional balance sheet to more accurately reflect their true worth. The intangible assets associated with the bits or electronic impulses that characterise the global information economy require different measurements to the tangible assets of the industrial economy.

New ways are required to represent the true value of intellectual capital in the balance sheet. This is because traditional accounting systems still manage costs of material and labour as consumables. In the knowledge economy, knowledge is the primary raw material, but it is not necessarily consumed as it is used. The conventional balance sheet also assumes that the cost of acquiring an asset e.g. a laptop computer is indicative of its value or worth, after allowing for adjustments such as depreciation. Yet the value of intellectual property is in its use, not in its costs. As an example, the customer loyalty database in the airline reservation system may be included as an intangible asset on the balance sheet, yet this is one of the most critical assets used

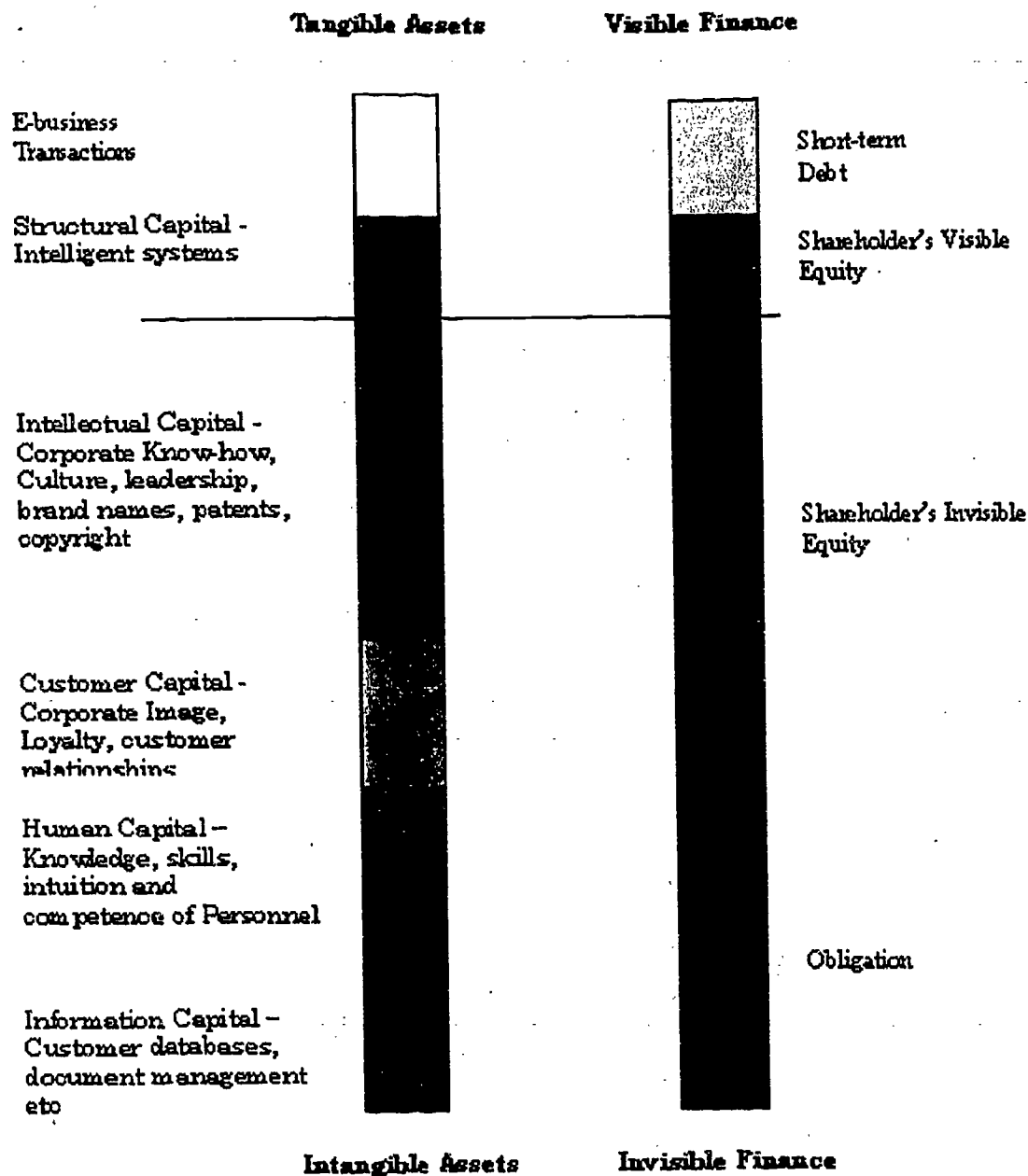
to measure the worth of the company.

Skyrme refers to an increasingly popular classification that divides intellectual assets into three:

- Human capital - that in the minds of individuals: knowledge, competencies, experience, know-how etc.;
- Structural capital - 'that which is left over after employees go home for the night': processes, information systems, databases etc.; and,
- Customer capital - customer relationships, brands, trademarks etc.

A fourth classification that may be added is information capital that measures availability, integrity, value and exploitation of the information asset within the organisation. Sveiby refers to this as professional know-how and organisational know-how. Professional know-how includes systems, rules, programs, manual, concepts that have been uniquely developed and are owned by the company. Organisational know-how is strategy making, marketing, planning that is measured by its ability to maintain and increase the value of the total organisation.

Sveiby (1994) has developed a model balance sheet of the Knowledge Organisation. In the model, intangible assets comprise the corporate know-how, the corporate image and the competence of the personnel. Unlike the tangible assets, they are both owned and not owned by the company. The shareholders' equity is represented as being visible and invisible, relating to their interest in both the tangible and intangible assets. A development of this model balance sheet is illustrated below.



The Balance Sheet of the Knowledge Organisation in the Future - based on Sveiby (1994) The Balance Sheet of the Knowledge Organisation

In the balance sheet, cash and accounts receivable as a tangible asset is replaced by e-business transactions. Capital investment in office space and computers is replaced by capital investment in intelligent systems. Intellectual, customer, human and information capital figure prominently as assets, financed more through shareholders' equity, with less as long term loans.

Social value

The social value of information and its supporting technologies' products and services is often discussed but rarely quantified in an environment that has, in the past few years, been driven by economic rationalism. Information and communications technologies are key agents in the

far-reaching changes that are affecting society. They are breaking the tyranny of distance within Australia and with the rest of the world; creating a global village in which access to new delivery channels of information, recreation and entertainment are having a profound effect on work, lifestyles, social intercourse and views of society. Information and knowledge are increasingly becoming available to everyone, the value being in enabling choice and in allowing individuals to make more informed decisions on all aspects of life, for example from health issues to career choice to investment.

New wealth and jobs have been created as part of the knowledge-based economy, and economic indicators can be used to measure the value of these new sources of income and employment. As a measure in valuing or assessing how effectively society has employed information and technology to meet its social and economic goals, macro economic benchmarks are often used.

Whilst these base indicators capture the level of opportunity of access, they do not take into account factors such as affordability, lack of individual skills or the poor local access regime that may mitigate against the use of the infrastructure. Neither do they take into account the fact that not all social messages are delivered in the virtual environment.

In terms of measuring the social value of information and its supporting technologies' products and services, the University of Adelaide has undertaken valuable work that assists in measuring such performance. Their measurement scale ranges from Highly Accessible to Very Remote and is an extremely useful tool in this area:

- Highly Accessible (no restrictions on accessibility of goods, services and opportunities for social interaction);
- Accessible (some restrictions on accessibility of some goods, services and opportunities for social interaction);
- Moderately accessible (significantly restricted accessibility of goods, services and opportunities for social interaction);
- Remote (very restricted accessibility of goods, services and opportunities for social interaction); and
- Very Remote (locationally disadvantaged - very little accessibility of goods, services and opportunities for social interaction).

Cultural value

The cultural value is very closely linked to the social value of information and its supporting technologies. This is because information and its supporting technologies assist with developing individual and collective minds and manners, and contribute to the intellectual and artistic development of different societies and groups. Cultural values also embrace issues such as sovereignty, cross cultural heritage and understanding of others' rights. Included in these aspects are the rights to determine ownership, presentation and management of information and knowledge. They are less of an indicator of financial worth, although financial worth can arise out of the cultural value of information. An example of this is in the value of Aboriginal Art, where stories and cultural symbols are depicted, and, the level of cultural significance and sharing of restricted knowledge can often influence the financial value of the art piece.

Culture as defined by distinctive customs, achievements, outlooks and ways of life is represented and passed on through oral tradition, pictures, paintings, as well as literature works. It is also contained in records management and archives. It is here that cultural values that relate to measures of worth, importance or usefulness surface in the debate about the preservation of the public record and government activities in the electronic record environment, particularly with regards to electronic transactions and the use of the World Wide Web.

The dilemma is between the cultural value, economic and practical feasibility of maintaining all copies of electronic records generated in government agency activities as a true record of decision-making on achievements and ways of life, and the cultural value in keeping a snapshot of

activities at regular intervals to form a record of the developments in national character, outlook and ways of doing things. The former is driven by needs associated with probity and accountability of decision-making within society, whilst the latter is driven by needs associated with maintaining a historical record or snapshot of society and cultural life at a given point in time.

The outcomes of each and the manner in which the public record is managed differ substantially. There is continued debate on this issue and both outcomes are desirable. However, it is only by understanding which of the two cultural value propositions have the most value to their stakeholders can institutions make informed decisions about how and what they will manage. For a single entity to try to do both is potentially uneconomic and impractical in respect of its ability to serve a specified purpose, cause or effect.

In the case of national libraries and public libraries their cultural value is most easily identified in being both a repository of information about ways of doing things and as a developer of mind and manners. Their contribution to society in general and to specific local communities can be measured by assessing their effectiveness and efficiencies in:

- Documenting and making available details of heritage;
- Creating a sense of belonging by being a gathering place of reference for the sharing of common interests, skills and knowledge;
- Acting as a catalyst and provider of lifelong education and training;
- Upholding the artistic and intellectual side of civilisation; and,
- Creating an environment in which there can be further development of minds.

Political value

The political value of information is found in its worth, importance and usefulness in communicating and supporting particular ideas, principles and commitments. It is used by individuals, political parties and other entities to advocate a specific viewpoint, often relating to a contentious issue. Used effectively, the political value of information can be very powerful and can achieve considerable success. Unfortunately its value is often diminished through misuse, with individuals utilising it for personal gain to achieve an outcome that can have a negative or detrimental impact on others.

Organisationally, the political value of information can be measured by the extent to which it relates to or affects the interests of status or authority within the organisation, or affects the interests and status of the organisation itself in its external environment, for example amongst its competitors. The political value of information can also be measured by the extent to which information in a message is:

- Used or manipulated to obtain an outcome;
- Sells a particular point of view; or,
- Puts forward a viewpoint conforming to a body of opinion on a social or corporate matter.

Economic value

Information utilities and information providers add value to and create new information products and services by manipulating, merging and redistributing information to meet existing and prospective customer needs. For example, the emerging Wireless Access Protocol (WAP) technology is as importantly a spatial data product as a mobile telecommunications product.

Measuring the value of information as a commodity or economic good is complex. For example, an information product or service has different values to different people in different situations and at different times. Unlike tangible items, information has unique economic properties that can affect its value at any one time. It can be stored and used at any one time, it can be re-used without diminishing in value, or in the case of competitive information, its value can lie in none having access to it.

The value of the information service or product must ultimately be judged in terms of the beneficial effects accruing from its use as viewed by those who sustain the costs. Burk and Horton (1988) rank or rate the information resource according to its:

- Effectiveness in supporting the activity it was designed to support;
- Strategic importance of the information resource (or service) to the activities of the parent organisation (stakeholder);
- Strategic importance of the activities being supported to the parent organisation (stakeholder).

Corporate value

The corporate value of information, knowledge and its supporting technologies is applicable to most organisations, although the measurements used will differ between profit and not-for-profit entities. Its value is found in the comparative usefulness and relative merit of information in assisting the organisation increase or maintain its efficiency, profitability and competitiveness. This must be used in conjunction with other things that the organisation uses such as intellectual property (brand names, trade marks, patents and copyright), marketing profile and customer relationships.

Corporately, the value of information services and products can be measured by the extent to which they bring to attention and supply quality, timely and relevant information that enables the organisation to:

- Meet corporate goals and objectives;
- Undertake informed strategic planning and policy making activities;
- Meet its legislative and regulatory obligations;
- Protect its interests and the rights of its employees and other stakeholders;
- Make consistent and rapid decisions;
- Effectively and efficiently utilise its resources;
- Provide evidence of business transactions and activities in the case of litigation; and
- Identify and manage risk; and evaluate and document quality, performance and achievements.

In the competitiveness portfolio, the value of information services and products can be measured by analysing the extent to which they make a difference to the organisation by converting inputs (financial, human, technical and information) to outputs (information services and products) that produce tangible outcomes. That is, the extent to which they:

- Provide reliable intelligence about new product and service developments in the competitive marketplace. For example, there is early warning of developments about competitors, technology, economic or legislative change that could adversely affect the business success of the organisation;
- Assist with decision-making to either deliver more effective and efficient services or maintain the competitive edge. By providing this early warning, surprises can be eliminated or their impact lessened;
- Add value to the quality and quantity of intellectual capital in the organisation. For example, they identify new markets or business opportunities, by making connections and identifying latent needs, by scanning trade publications or market analysts' reports;
- Assist in research and development of a new product or service. For example, in sourcing new suppliers or providing SDI and specific research services; and,
- Ensure that the customer continues their value association with the organisation. For example, the most important asset of a major airline is not their planes - it is their customer database that knows where a valued customer likes to sit on a plane, what food they like - and other things that keeps that customer flying with them, not their competitor.

Personal value

The personal value of information and its supporting technologies is closely linked to the ideas expressed under social and cultural values. It is found in the extent to which the information enables an individual to operate in a complex world. In the global society it is important to recognise that personal values can differ between cultures and that individual expectations and perceptions of quality and value can impact on service delivery. For example, in:

- Germany, the dominant element in any form of quality and value is associated with the acceptance of standards;
- Japan, it is measured through pursuit of perfection;
- France, it is associated with luxury;
- United States of America; it is deemed valuable if it works; and,
- Australia it is based on the value and quality of the relationship between the customer and the provider of the product or service.

Developments in value propositions in information, knowledge and supporting technologies.

Since the 1970's information, knowledge and their supporting technologies have been slowly revolutionising the manner in which we work, access information, communicate and relate to others. At each stage of development, achievements and outcomes have differed and the consequential measures of value and performance have adjusted accordingly.

The first wave

The information technology revolution began in libraries and information centres in the late 1970's and early 1980's with data management, focussing on back-office systems in mainframe environments. Computers were employed to manage tangible assets and undertake large-scale, repetitive tasks such as the issuing of books and related materials. They were used for number crunching, to detect and correct errors, to determine the best use of assets, and to speed up manual processes. The early adopters were the large university, public and state libraries.

In both the vendor and client environment, a stovepipe mentality prevailed with separate modules being developed for acquisition, cataloguing and circulation. Books and serials were treated differently, with separate modules being developed for serial acquisition. Data was delivered through printouts containing lists of exceptions and totals of figures. The jobs created were in data input and mainframe management. Business cases for based on, and outcomes were measured in terms of productivity and efficiencies. In automating manual processes, the computer enabled tasks to be undertaken faster and cheaper. There were also economies of scale. Other advantages were gained in enabling the better use of resources, through inventory planning and other systems; but the focus was internal. Value was created in terms of the productivity gains and planned efficiencies that information technology brought to the organisation.

The second wave

By the mid 1980's and early 1990's a second wave was created that had an impact on library and information service delivery and its relative place, both physically and organisationally. A key contributor to the second wave was the realisation that information and its supporting technologies were, themselves, valuable assets and had a part to play in keeping and maintaining customer relationships.

Systems were designed to collect information about the customer as well as to deliver services. Information was collected about what the consumer bought, their preferences and spending patterns. New markets were created based around information products and services. The focus shifted to the front office environment and the management of information. The technology environment was characterised by shared networks of PCs where people at the front counter were

able to access information and be in charge of decision making. The second wave also included the rise of groupware and executive information systems through which information was shared for better management decisions: but still everyone was presented with the same view.

For libraries and information services, the second wave meant that customised services were delivered direct to the individual on the desktop. The need for the library to occupy a prominent space in the building diminished when services could be delivered to each customer. With the assistance of network technology and databases, the customer not only had information at their fingertips, they were also in a position of searching for and discovering information themselves. Dial up, external access was also a feasible option in extending services to remote customers.

Value was created in terms of customer service delivery and enabling better decision-making, as well as in the creation of new products and services having an economic value.

The third wave

The third wave, or knowledge management era, began in the mid 1990's. In the third wave, all knowledge sets, human and virtual are integrated and information is tailored to meet the end user's needs. Interactive multimedia, video and other advanced technologies capture and disseminate knowledge through intelligent systems, Internet and Intranets. The knowledge of individuals plays a key role, and the organisation is actively and conscientiously acquiring new knowledge and retiring the old.

All knowledge transmission agents, including libraries, records management and archives are integrated. Information delivery is integrated with teaching and knowledge sharing devices. The phone, e-mails, Internet, the Web and Intranets are employed in an integrated manner. There are common systems for document management, electronic messaging, groupware, intelligent agents, and data mining. Key elements such as directories are not duplicated across systems, but are integrated.

The focus is external: in better understanding the external environment and the driving forces of the future; in strategies and managing intangible assets to competitively distinguish the organisation from others; and, in creating added value through collaborative knowledge sharing with suppliers, strategic partners and customers.

Organisations in the third wave, measure performance by evaluating flexibility and the extent to which intellectual assets, internal and external systems and processes can quickly and effectively share and transport knowledge in a manner that leverages its value.

Their capital value is not in tangible assets such as buildings, but in intellectual assets that comprise information systems, laboratories, competitive and market intelligence, knowledge of market channels and management focus, which all help to turn individuals' know-how into the property of the group.

The fourth wave

The new wave is mobile. Its impact is already seen in Asia and emerging in Australia. It is set to bring yet another major, incremental change to economic and social activities, to the delivery of services and business transactions. Mobile commerce platforms and WAP phones enable the delivery of tailored information on the go. For example, the nearest Thai restaurants to the street corner where you are standing when visiting New York, and details of their menus so that a choice can be made; or the latest in stock exchange movements in Australia within the portfolio of your choice.

The future

In turning to the future, three questions can be asked:

- What are the likely future impacts?

- What value propositions are appropriate for the future?
- What part will libraries and information services play?

Future impacts

Technological change and its effects on how we access, use and value information in society and organisations has considerable impact for libraries and information services. The Web, desktop videoconferencing systems and other products have created the opportunity for individuals to have access to experts and expertise at their fingertips. The traditional role of managers as the gatekeepers of information has gone. However, there is a fine line between being in a desert of knowledge and being awash with information. Too much, or information overload is equally as non-productive as having no or little information upon which to make decisions. The focus for libraries and information centres needs to be on creating and managing its value as well as in presenting it in the view of the individual and their needs.

Information will be downloaded to machines maybe at the airport, train station, corner shop, library or foyer of a large office block. It may also be downloaded to a palm pilot device mid air through a satellite phone, or into the car through a device attached to the fuel bowser.

A considerable amount of energy will be needed towards capturing, developing and transferring knowledge and understanding of customer's needs, preferences and businesses. This is the knowledge that is most likely to pay off economically, as it is serving more than 211 countries.

Having the physical tools and access to customer knowledge to undertake research is only part of the equation. There is also the need to have the skills and personal expertise to manage and use the knowledge to the best advantage. In managing the smarts, there is the need to distinguish between what is noise and what is true knowledge and intellectual property that can be leveraged to become a higher-value asset. True knowledge and intellectual property has a purpose and a use for the organisation - its value is in that it fits the culture, the core business and its corporate strategy.

Future value propositions

There are close parallels between value and use. The future in valuing and managing performance in the global information environment is in understanding the contribution of information and its supporting technologies to the individual, organisation or community.

Values propositions such as convenience and trust in the delivery of timely and quality services can assist in differentiating library and information services from other channels. This involves the creation of a relationship with a customer through the provision of consistently higher services or products than those of competitors, and, targeted services that meet stakeholder requirements in a manner not provided by others.

Generally people are looking for a service or products that:

- Are customer focused;
- Are timely in delivery;
- Meet a need in a manner that others cannot in the marketplace. The need might be based on specialised knowledge, mode of delivery, trusted source;
- Are convenient to access, physically and technologically;
- Are easy to understand and use; and,
- Cannot be delivered cheaper elsewhere;

Are delivered by courteous and knowledgeable staff, or trusted, secure and reliable infrastructure.

What part will libraries and information services play?

In the global information environment, libraries and information services add to the distribution channels, they do not replace them. The future will be presented as an environment in which individuals will have many different ways of accessing information. Libraries will be one of these channels.

To remain competitive in this multi-dimension knowledge marketplace, libraries and information centres will need to develop more efficient and effective mechanisms for:

- Identifying important sources of information that will make the critical difference; and,
- Making this knowledge available to their customers, creating an 'informed' and competitive organisation or society.

New roles can be created out of the library or information service's existing expertise in areas that are of concern and confusion to others. These include:

- Designing user friendly search capabilities and presentation formats for intranet search engines, emerging WAP applications or e-commerce databases;
- Managing metadata initiatives that assist in the discovery and retrieval of relevant information;
- Managing the growing complexities of property and moral rights in a multimedia environment; as well as,
- Sifting through and monitoring delivery channels such as external search engines and good Web sites for specific types of information needs.

The value proposition will be in using multiple delivery channels to add value by personalising, localising, specialising and customising services. For example, the University of Berlin Central Library is using WAP technology to notify students via their mobile phone when their books become overdue or available after reservation. By forming alliances and recognising that variety and choice is good, new content rich services, offering ubiquitous access can be developed to meet the needs of individuals, organisations and communities in the global information environment.

In conclusion, the future is ripe with opportunity and challenge. In life there are two choices. Either we can create the future, or the future creates (or destroys) us. The creative future will be in selling new services, forming new alliances and recreating new value propositions in a complex, changing, demanding and interactive world of multiple delivery channels.

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